

REMARKS

Difference Between “Metallic Glass Alloy” And “Amorphous Alloy”

It should be noted that the term “metallic glass alloy” is of a different concept distinguished from “amorphous alloy.”

Amorphous alloy conventionally was limited to the shapes of thin strip or fiber with poor plastic workability. High glass forming ability was discovered regarding Pd-Si-Cu amorphous alloy in the 1990s, and such metallic glass alloy has made it possible to obtain amorphous alloy in bulk shapes.

When conventional amorphous alloy is heated, it usually crystallizes before reaching glass transition temperature and glass transition cannot be seen. In contrast, when metallic glass alloy is heated, it exhibits a clear glass transition, which has the supercooled liquid temperature range of several tens of degrees K. Thus, metallic glass can be cast in a metal die, e.g., copper die, to obtain bulk amorphous alloy.

Thus, the terms “metallic glass alloy” and “amorphous alloy” are not synonymous, but these terms are distinguished in academic fields. “Metallic glass alloy” is defined as amorphous alloy which exhibits a clear glass transition. In this sense, “metallic glass alloy” is species of “amorphous alloy”. However, because metallic glass alloy has high glass forming ability, it can be obtained as large products by relatively slow cooling speed. Also, metallic glass alloy can be plastically worked with heating.

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Thus, “metallic glass alloy” is different from conventional amorphous alloy which was limited to thin strip or fiber shapes, and metallic glass alloy has uses different from those of conventional amorphous alloy.

It is not easy to discover metallic glass alloy which has high glass forming ability together with other useful properties, e.g., magnetic, electric, chemical, mechanical, etc. Extensive research and experimentation are required to discover useful metallic glass alloy. Therefore, the metallic glass alloy composition is not obvious merely because prior art discloses alloy composition of conventional amorphous alloy which coincidentally overlaps.

Rejections under 35 USC §102(b) and §103(a)

Claims 1 and 2 were rejected under 35 USC §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over each of Sawa et al. (U.S. Patent Application Publication No. 2001/0031373) and Yorio et al (Japanese Patent Publication no. 07-183,113).

Claim 1 has been amended to recite “wherein said glass alloy product has minimum thickness or diameter of 0.5 mm or more.”

In Sawa et al, the products have dimensions of 80 μ m (width) x 60 μ m (thickness) x 3mm (length), see [0117]. Also, Yorio obtains the amorphous alloy ribbon by single roller method. Although Yorio does not provide specific dimensions of the amorphous alloy ribbon, it is presumed that the thickness of the ribbon to be several μ m to several tens μ m because ribbons

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obtained by single roller method are of such thickness and Yorio does not indicate that the ribbon has special dimensions which are different from those of conventional amorphous alloy.

Thus, Sawa et al and Yorio et al do not teach or suggest “wherein said glass alloy product has minimum thickness or diameter of 0.5 mm or more.”

For at least these reasons, claim 1 patentably distinguishes over Sawa et al and Yorio et al. Claim 2, depending from claim 1, also patentably distinguishes over Sawa et al and Yorio et al for at least the same reasons.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

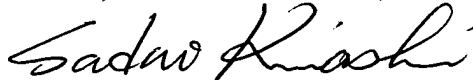
If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants’ undersigned attorney to arrange for an interview to expedite the disposition of this case.

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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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